

ABSTRACTTHz semiconductor laser incorporating a controlled plasmon confinement waveguide

A semiconductor laser comprises an active region (12) which, in response to a pumping energy applied thereto, can produce a stimulated emission of radiation with a central wavelength (λ) in the far infrared region, and a confinement region (16, 18, 22) suitable for confining the radiation in the active region (12), and comprising at least one interface (16a, 16b, 22a) between adjacent layers that is capable of supporting surface plasmon modes generated by an interaction of the interface with the radiation. The confinement region (16, 18, 22) comprises a wave-guide layer (16) which is delimited on opposite sides by a first interface and by a second interface (16a, 16b). The guide layer (16) is doped in a manner such that the first and second interfaces (16a, 16b) are capable of supporting the plasmon modes, respectively, and is of a thickness (d) such as to bring about the accumulation of the plasmon modes in proximity to the first and second interfaces (16a, 16b), outside the layer (16), and substantially a suppression of the plasmon modes, inside the layer.

(Figure 1)